REMARKS

Applicant replies to the Final Office Action mailed on April 23, 2007, within three months. Claims 1-10 were pending in the application and the Examiner rejects claims 1-10. Applicants request that the Examiner consider the amendments and remarks prior to examining the above-referenced patent application after RCE. Support for the amendments may be found in the originally-filed specification, claims, and figures. No new matter has been introduced by these amendments. Reconsideration of this application is respectfully requested.

The Examiner objects to Figs. 1 and 3-11 for being not of sufficient quality so that all details are reproducible in the printed patent. Applicants submit herewith clean copies of the Figures as Replacement Sheets, which do not include any changes or add any new matter.

The Examiner next asserts that the incorporation of essential material in the specification by reference has been done improperly. As suggested by the Examiner, Applicant amends the disclosure to include the material incorporated by reference. The material being inserted is the material previously incorporated by reference and the specification amendment contains no new matter, as required by 37 CFR 1.57(f).

Specifically, the Examiner asserts that "the phenomenon that elasticity emerges in the bond between atoms of the material" is central to the working of the invention, but inadequately described in the specification possibly due to the alleged improper incorporation by reference as described above. Applicant asserts that, by proper incorporation of the reference as set forth above, the specification properly describes the "phenomenon that elasticity emerges in the bond between atoms of the material".

The Examiner next objects to the specification under 35 U.S.C. 112. first paragraph, because concepts and methods critical or essential to the practice of the invention are not enabled by the disclosure. The Examiner also rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Applicant respectfully traverses this objection and rejection.

More specifically, the Examiner asserts that the specification does not adequately describe how to make or use the invention. The primary issue in contention includes how the deuterium atoms are brought within 0.6 Δ or less of one another simply by being in a relationship with metal atoms, and how the $^2D + {}^2D = {}^4He$ + lattice energy (23.8 MeV) is favored over the other branching probabilities.

Applicant submits a copy of "*Eur. Phys. J. A* 27, s01, 187-192 (2006)", which discusses how d+d branching probabilities can be effected in metallic environments, and also result in the abatement of the Coulomb barrier. Applicant specifically asserts that the reference recites in the Introduction that:

> There is multiple evidence that the physical environment where the nucleus is embedded can influence nuclear interactions, e.g. this is employed in nuclear condensed matter physics.
>
> In order to investigate the environmental impact on nuclear reactions, we experiment with the d+d reactions in metallic environments. We have already found a strongly enhanced electron screening effect leading to gross increase of the effective cross section by abatement of the Coulomb barrier due to the metal electrons which was later confirmed.

The Conclusion recites:

> We presented a first experimental evidence for an alteration of the branching ratios in the d+d fusion reactions obtained in an accelerator experiment which can be theoretically explained by polarization of the reacting deuterons in the crystal lattice.
>
> So with the spin polarization is here another new way how the environment electron configuration can influence immediate nuclear processes. The dense bound and free electrons in the metal can abate the Coulomb barrier in a dynamic process prior to the reaction generating a gross enhancement of the cross section which can still not be described by theory to this extent.
>
> Our findings also provide a first independent support for the claim in cold fusion that requires a heavily alteration of the d+d reaction channels in contradiction to the results obtained for gas targets.

As such, Applicant asserts that the publication therein shows that the branching probabilities of d+d nuclear reactions can be affected by interaction in a metallic environment and also that the Coulomb barrier can be reduced. Further, a theory is provided as to why this may occur.

The Examiner next rejects claims 1-10 under 35 U.S.C. 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter because they do not recite the input energy required for the invention to work. Applicant respectfully traverses this rejection.

To expedite prosecution, Applicant amends the independent claims to specify that the energy is --sufficient that at least two of the plurality of hydrogen isotope atoms solid-dissolved in the hydrogen condensate fuse--. Support for this amendment can be found, for example, on page 19, paragraph 2 and page 23, paragraph 3 of the Specification. Applicant asserts that the claims now sufficiently describe the level of energy necessary to initiate the reaction. It should be appreciated that the exact energy required would vary depending on the materials used. However, this parameter would be easily selected by one skilled in the art.

The Examiner next rejects claims 1, 3, 6, and 8 under 35 U.S.C. 112, second paragraph, as incomplete for omitting essential steps of "condensing the hydrogen isotope". Applicant respectfully traverses this rejection.

To expedite prosecution, Applicant amends the independent claims to specify the step of "condensing the hydrogen isotope." Support for this amendment can be found on page 21, lines 7-24 of the Specification. Briefly, the steps are:

(a) providing the nano-ultrafine particle in a container;

(b) evacuating the container to high level of vacuum; and

(c) introducing the hydrogen isotope atoms into the container so as to solid-dissolve the hydrogen isotope atoms in the nano-ultrafine particle so that the hydrogen condensate has a hydrogen isotope atoms/nano-ultrafine particle atom ratio of 250% or more.

The Examiner also asserts that the claims are unclear because the "internuclear spacing of a molecule consisting of (the) two hydrogen isotope atoms" has not been established. According to the Examiner's arguments, said spacing varies depending on conditions such as "temperature and the molecule's proximity to other molecules". Given that such knowledge is well-known to the Examiner, Applicant asserts that one of ordinary skill in the art with common general knowledge would easily be able to assess such conditions and determine the internuclear spacing. However, for the sake of expediency, Applicant amends the independent claims to recite "internuclear spacing of a molecule consisting of the two hydrogen isotope atoms under the same conditions as the at least two of the plurality of hydrogen isotope atoms" (emphasis added).

The Examiner next rejects claims 1-10 under 35 U.S.C. 101 because the disclosed invention is inoperative and lacks utility. Applicant respectfully traverses this rejection.

Applicant asserts that this rejection is largely based on the preceding rejections which have been appropriately addressed above. As such, Applicant asserts that the utility of the invention is well-known to those skilled in the art.

The Examiner next rejects claims 1-10 under 35 U.S.C. 112, first paragraph, as not supported by either a credible asserted utility or a well established utility. Applicant respectfully traverses this rejection. Applicant asserts that this rejection is largely based on the preceding rejections which have been appropriately addressed above. As such, Applicant asserts that the utility of the invention is well-known to those skilled in the art.

The Examiner next rejects claims 1-10 under U.S.C. 103(a) as being obvious over Zaluska at al. (Appl. Phys. 2000) and admissions by the Applicant. Applicant respectfully traverses this rejection.

Applicant asserts that, based on the above arguments and amendments, the presently claimed invention cannot be made obvious by Zaluska, as Zaluska does not describe a viable method for producing energy by the fusion of two hydrogen isotope atoms.

Applicant respectfully submits that the pending claims are in condition for allowance. Reconsideration of the application is thus requested. The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account No. **19-2814**. Applicant invites the Examiner to telephone the undersigned if the Examiner has any questions regarding this Reply or the present application in general.

Respectfully submitted,

Dated: July 20, 2007 By: _____
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